Calculation Tools at SP Fire Technology

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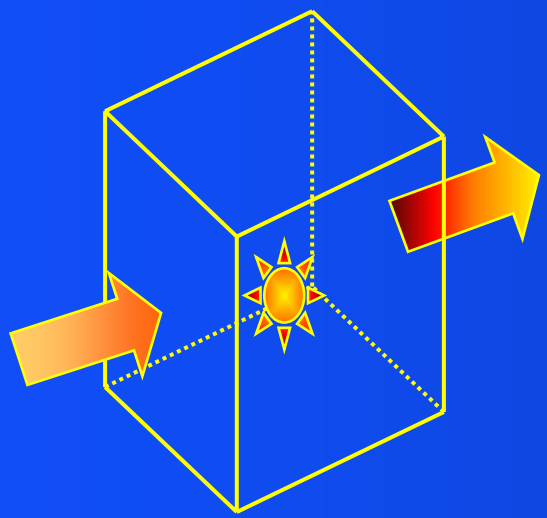
Different models

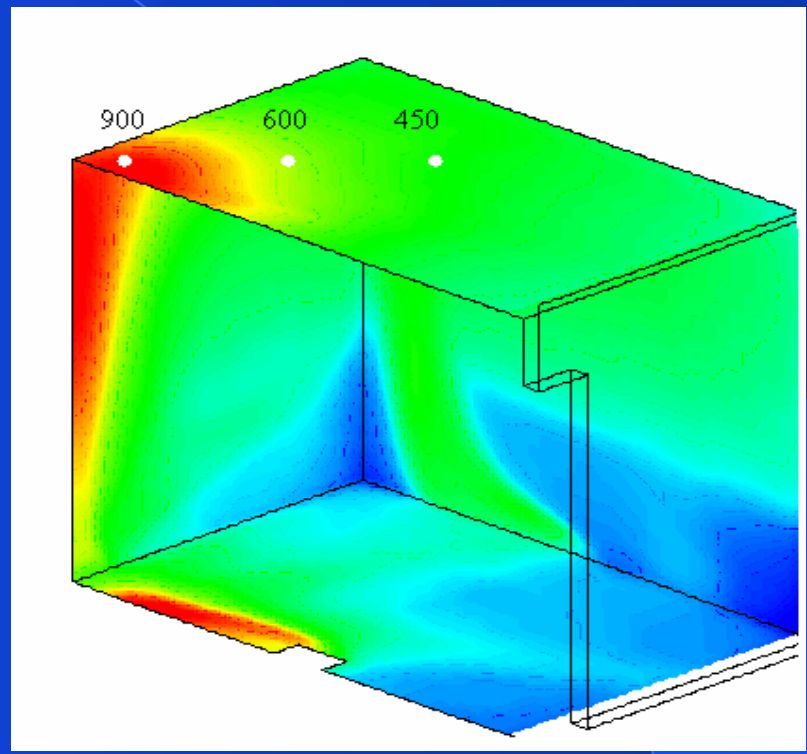
- Thermal calculations: TASEF
- CFD code: SOFIE
- Conetools – A link between cone calorimeter and SBI/Room tests
- Flame spread models for cables, floorings and wall and ceiling linings
- FREIA: a risk analysis tool

SOFIE (Simulation of Fires in Enclosures)

IN
Mass flow
Momentum
Energy
Species



OUT
Mass flow
Momentum
Energy
Species



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Applications of CFD

- Calculation of smoke transport in buildings and tunnels
- Detector activation
- Interaction sprinkler and smoke, two phase model
- Development of test methods
- Flame spread on cables and wall/ceiling linings
- Production and spread of species (e.g. CO, HCN)
- Tool in fire investigations (Switel hotel Antwerp, Gothenburg disco fire)

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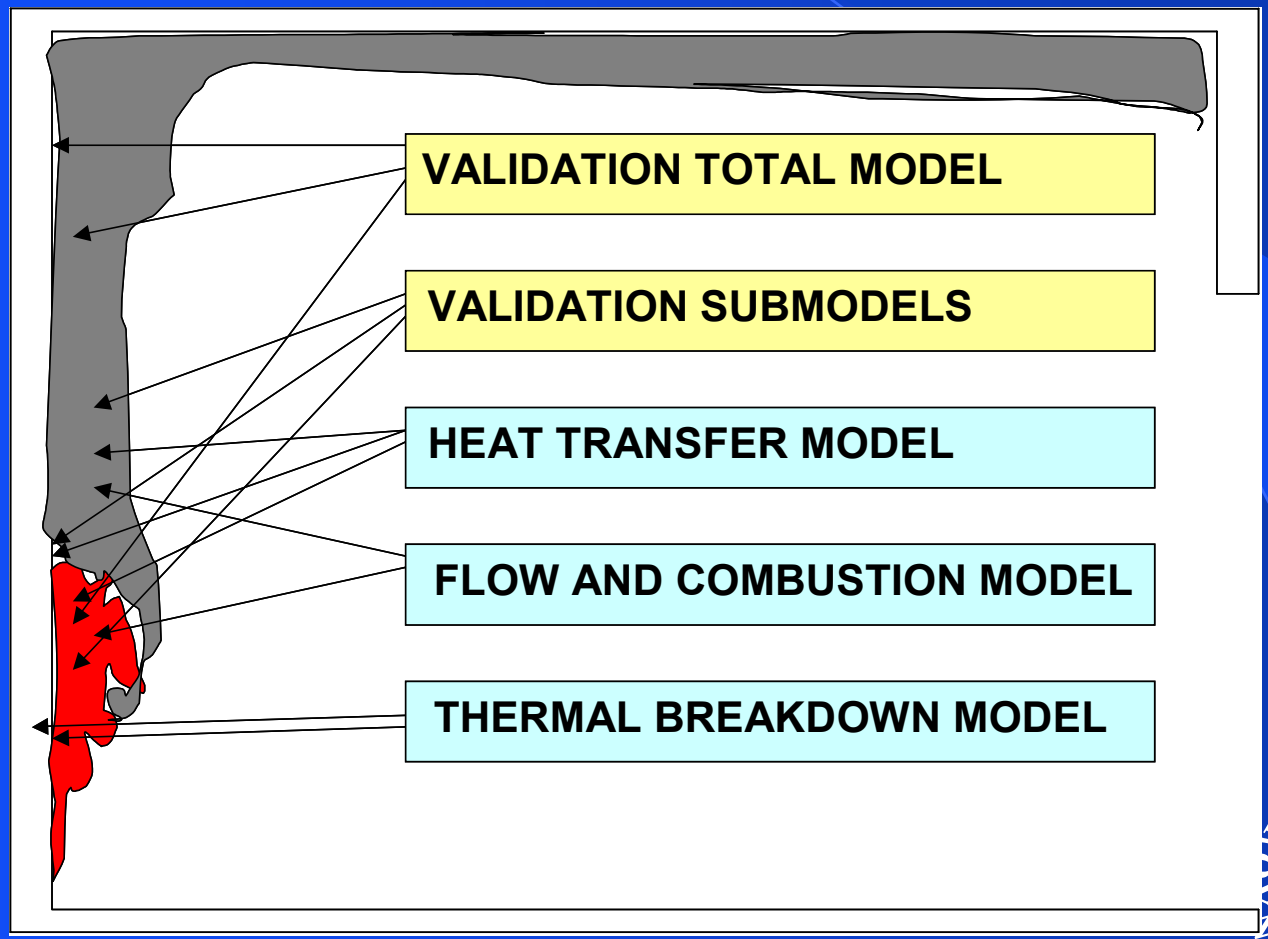
CECOST Project

- Initiated by Centre for Combustion Science and Technology at Lund
- Aim: to improve CFD simulation of flame spread and fire growth
- More info www.cecost.lth.se
- 5 PhD students located three Swedish univsities and at SP

CECOST


VALIDATION TOTAL MODEL
VALIDATION SUBMODELS
HEAT TRANSFER MODEL
FLOW AND COMBUSTION MODEL
THERMAL BREAKDOWN MODEL

Examples of applications projects

- CFD simulation of the Gothenburg fire
- Flame spread incorporated in CFD: example of flame spread on cables, simulation of the FIPEC tests
- Flame spread incorporated in CFD: example of fire spread in room corner test (ISO 9705)

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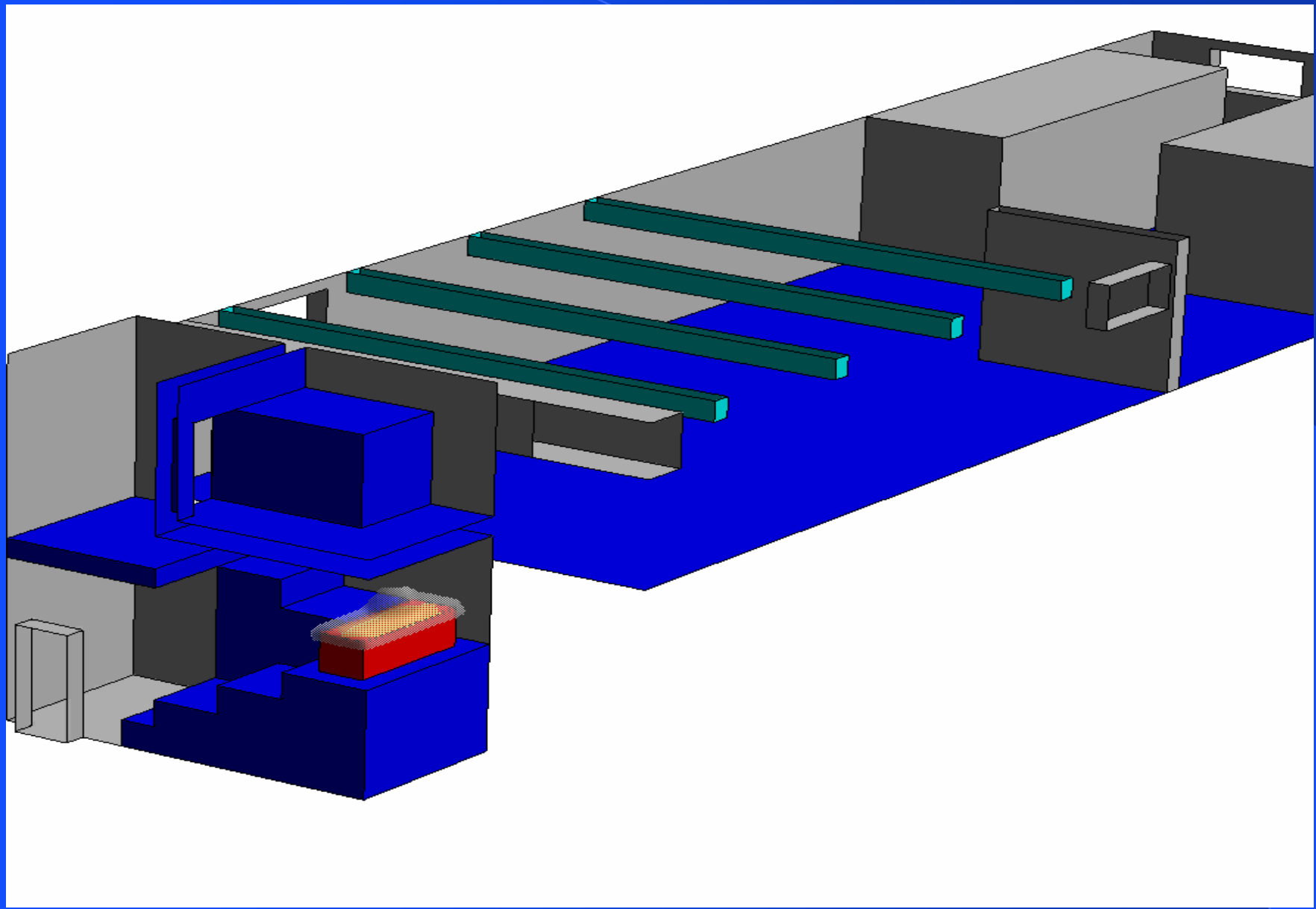
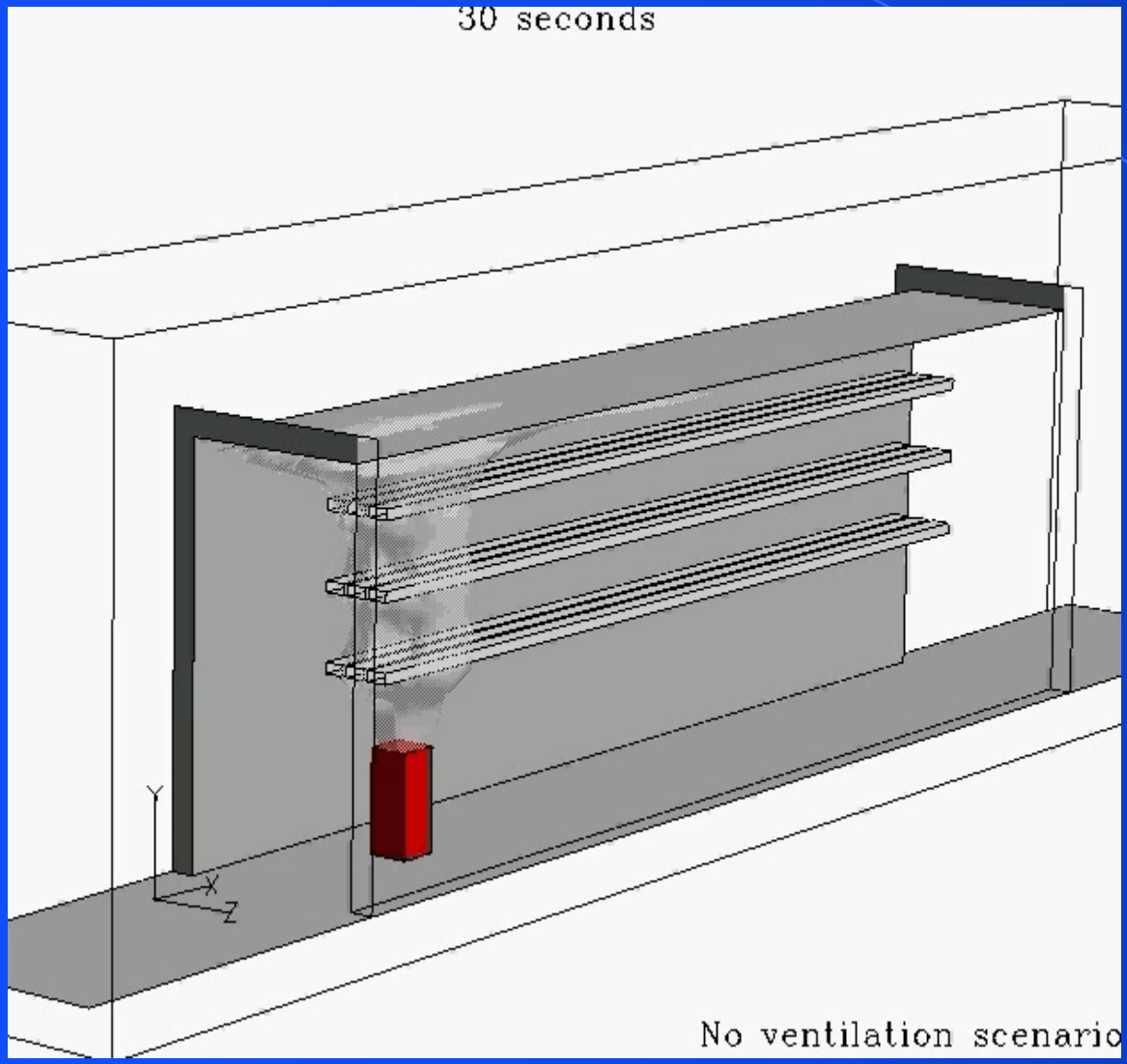
Gothenburg disco fire

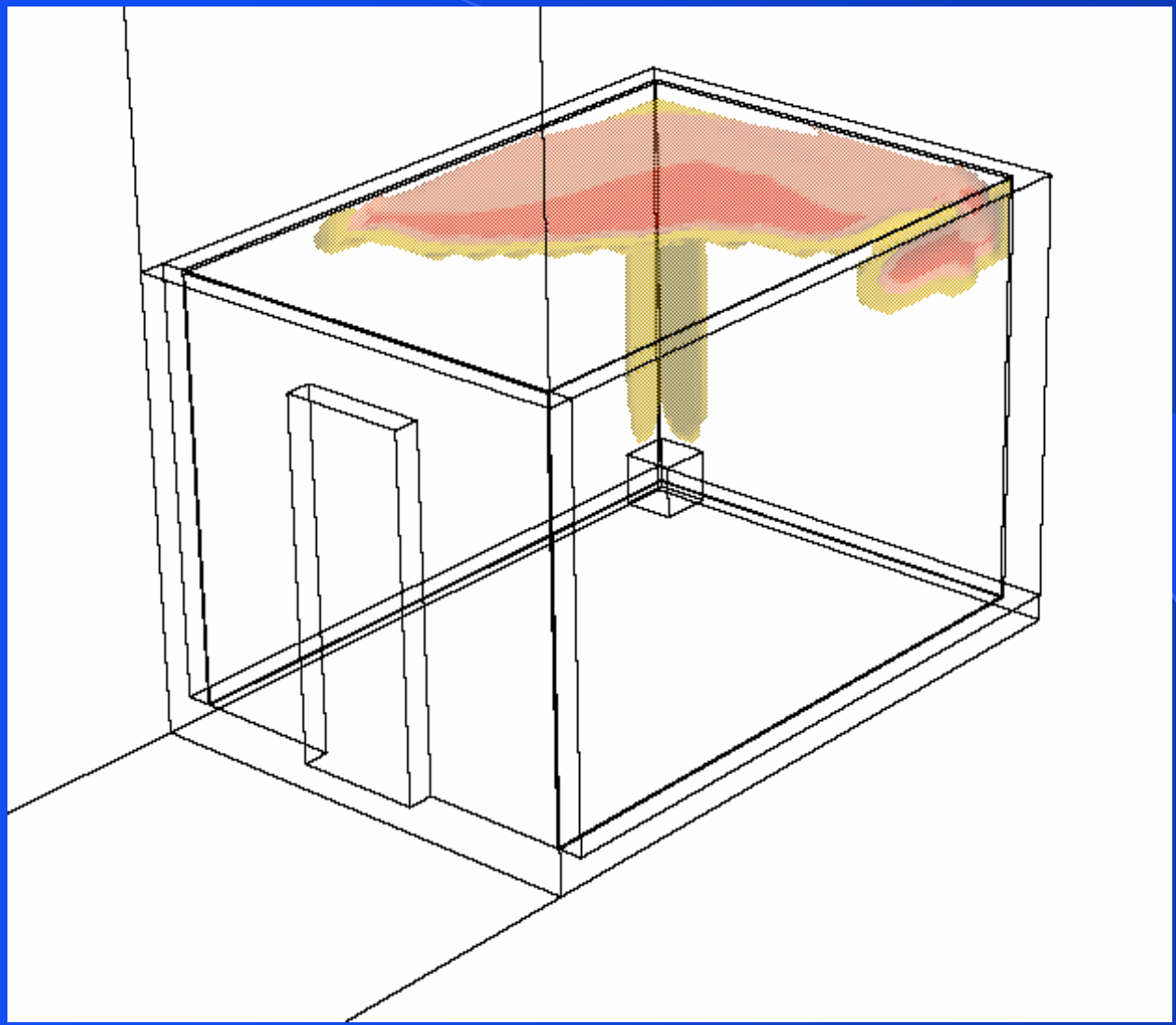


Flame spread on cables



- Effect of ventilation studied
- Results validated against FIPEC real scale tests

Room corner simulation (flame spread)



Conclusions

- SP is involved in different research projects were several calculation tools are developed with different complexity.
- The use of CFD models is constantly growing and allows e.g. prediction of fire growth.